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A DUST GUN FOR LABORATORY EXPERIMENTS WITH INSECTICIDES

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The equipment described herein was designed for applying small weighed quantities of derris and pyrethrum dusts according to a technic employing a spray gun that was used previously in testing liquid preparations of the same materials. The apparatus was operated by compressed air and consisted of a dust-delivery mechanism mounted on a common type of laboratory spray gun for the purpose of utilizing the air-valve control lever of the sprayer (fig. 1, A). This assembly was connected to a reducing valve and pressure gauge on a compressed-air line by a section of air hose.

The duster attachment (B) consisted of a short delivery tube mounted on a cylindrical housing containing an air-driven wheel and a fine-toothed disc. The dust delivery tube was made of two short sections of 1/4-inch brass pipe joined by a brass tee attached to the dust cylinder. The dust cylinder was 3-1/2 inches in diameter and 3/4 of an inch in length and was fashioned on a lathe from a large bronze bearing. The inside diameter of the cylinder was cut slightly larger for a distance of about 3/8 of an inch from one end, and a tightly fitting disc of sheet copper was pressed in against the flange formed by the difference in diameter and soldered in place to form a partition. The inside diameter was also cut slightly larger for a distance of about 1/16 of an inch from each end of the cylinder to form flanges for receiving the front and back cover plates (D and E). Plates closing the ends of the dust cylinder were made of heavy sheet copper and were held in place by nuts on the end of a stationary steel shaft placed through the center of the housing.

The wheels were made from discs of sheet copper and were mounted on a bronze sleeve or bearing fitted to turn freely on the steel shaft. The sleeve extended through a hole of slightly larger diameter in the partition and was equipped with outside threads for mounting the toothed wheels. These were clamped rigidly to the sleeve on opposite sides of the diaphragm by means of thin lock nuts on both sides of each disc. Small vanes were fashioned along the edge of the drive wheel (C) by cutting in about 1/4 of an inch

at 1/8-inch intervals and twisting these sections at right angles to the plane of the disc. Teeth of the dust wheel (E) were made in the same way, except that the cuts were made just deep enough at 1/16-inch intervals to give the sections a slight twist and roughen the edge of the disc.

Two small copper tubes, fastened with solder, passed through a plug in the delivery tube to divide the air stream. One of these tubes was led through a small hole in the top of the cylinder and was bent to direct the compressed air against the blades of the drive wheel. Holes were cut in the back plate (D) to permit escape of the air. The other tube was extended beyond the brass tee in the delivery tube to produce a suction at the top of the dust chamber, where air was admitted through two small holes bored in the housing (F). The end of this tube was soldered over and then partially opened with a needle to make a smaller opening, so that the greater portion of the air would pass through the other tube and be used in spinning the wheels.

The insecticidal dust was introduced through a hole in the front plate that was opened by unscrewing a metal cap. The dust was carried upward on the teeth of the disc and by the agitation of the air produced by revolutions of the dust wheel, then it was taken through the brass tee into the delivery tube by suction and expelled by compressed air. It was apparently unnecessary to clean the reservoir or dust chamber between operations, but the cleaning could easily be done by removing the front plate and dust wheel. A slight residue was left in the delivery tube after applying each dust charge, and this was removed with a small brush. The rate of dust delivery was regulated by adjusting the reducing valve to determine the pressure of the compressed air. This control also permitted the delivery of dusts of different physical properties at about the same rate. The present apparatus gave a more complete dispersal and more uniform delivery of the entire dust charge than other types of equipment tested.

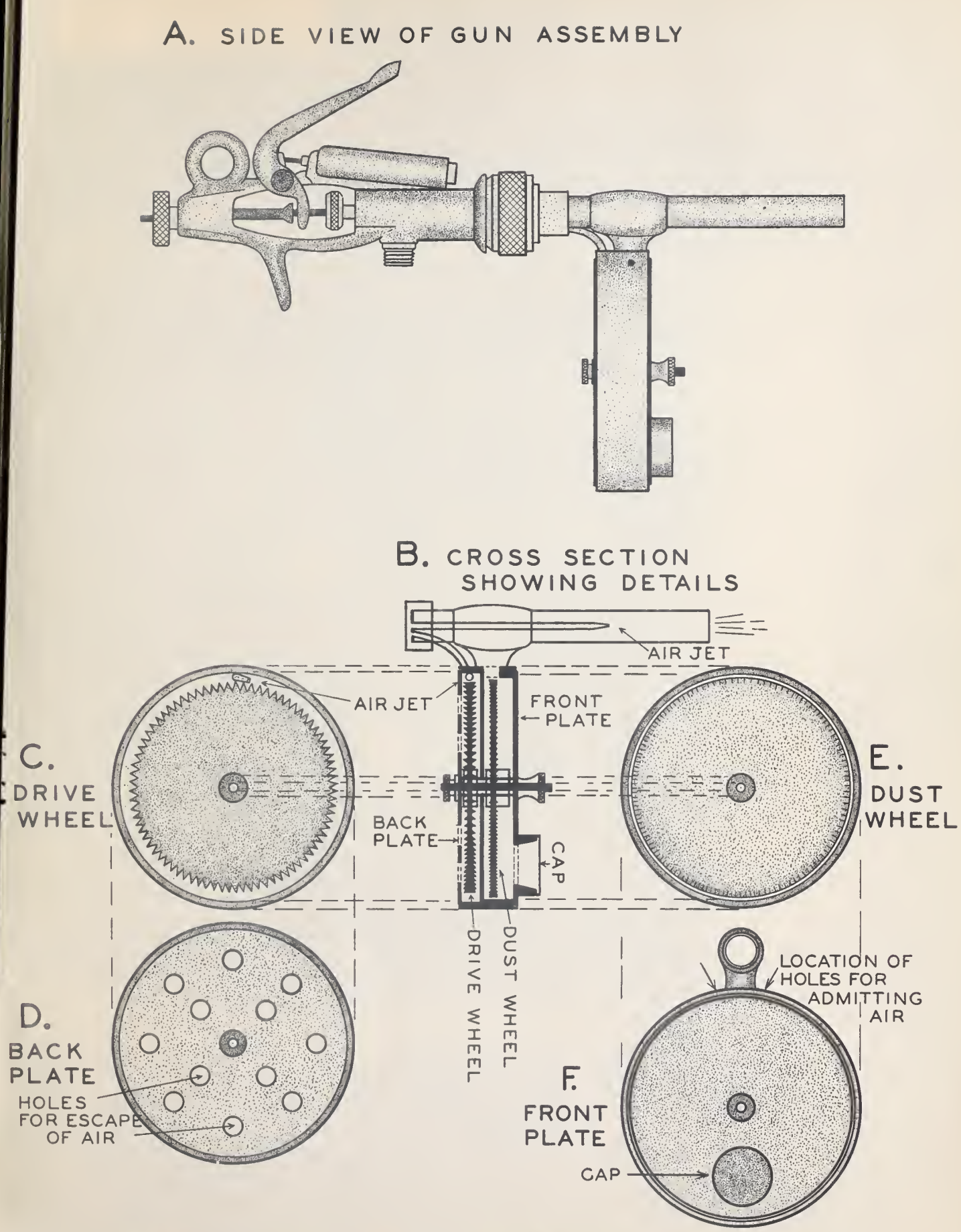

Figure 1.--Diagram of the dust gun showing details of construction.